

I claim:

1. An apparatus for enhanced gravity casting comprising:

a housing;

5 a molten metal holding chamber in said housing;

an inlet passage in said housing, said inlet passage located in fluid communication with said chamber in said housing;

10 a mold part, said mold part having a battery part cavity therein, said mold part having an opening for ingress of a molten metal therein;

15 a movable mold part, said moveable mold part having an end face and a sidewall, said sidewall engageable with the inlet passage to capture molten metal in the cavity and prevent flow of molten metal to or from the cavity, said movable mold part end face maintainable in contact with a portion of the molten metal in the cavity under a following force to cause the movable mold part end face to move toward the cavity to reduce a mold cavity volume in response to the molten metal solidification contraction.

2. The apparatus of claim 1 wherein the movable mold part is located at least partly in the molten metal in the molten metal holding chamber.

20 3. The apparatus of claim 1 including a member for maintaining a constant following force on the movable mold part to allow the moveable mold part to move in response to the molten metal solidification contraction.

4. The apparatus of claim 1 wherein the molten metal comprises molten lead.

25

5. The apparatus of claim 4 wherein the moveable mold part is located at least partly below a molten lead interface with a surrounding atmosphere.

6. The apparatus of claim 4 wherein the moveable mold part includes a shoulder and the mold part includes a shoulder for limiting contraction of the volume of molten metal in the cavity.

5

7. The apparatus of claim 4 wherein the movable mold part has a first diameter and the inlet has a second diameter with a diametrical difference between the first diameter and the second diameter of about .005 inches to allow air to flow out while preventing lead from flowing therewith.

10

8. A mold for enhanced gravity casting comprising:

a first mold part having a mold cavity, said first mold part having a top inlet passage;

a chamber for holding a molten lead, said chamber positioned above said top inlet passage to permit a gravity flow of the molten lead into the mold cavity;

a second mold part, said second mold part having an end plug engageable with said inlet passage, said end plug and said inlet passage having an air clearance therebetween to permit air in the molten lead in the cavity to escape but the air clearance insufficient to permit molten lead to escape from the mold cavity when in an engageable condition; and

20 a member for maintaining a downward following force on said second mold part to allow a mold surface on said second mold part to move toward the mold cavity as the air escapes from the molten lead in the cavity.

9. The apparatus of claim 9 wherein the second mold part is located at least partly in a chamber of molten lead with the chamber in fluid communication with the mold cavity and the molten lead in the chamber maintainable in a molten state to permit gravity casting of a second article by removing a first cast part and replacing the mold part below the chamber.

10. A method of enhanced gravity casting comprising:

5 directing a charge of molten lead into a chamber located in fluid communication with a battery part cavity;

10 allowing the battery part cavity to fill with molten lead under a gravity flow condition;

 extending a shutoff member located in the molten lead in the chamber into engagement with a mold inlet passage while the molten lead is in a liquid state to close off the inlet passage and prevent further gravity flow of molten lead into the mold cavity; and

15 maintaining a following force to generate sufficient pressure on the shutoff member as the molten lead solidifies to allow the shutoff member to follow a volume contraction of the molten lead in the mold cavity to thereby form an enhanced gravity casting.

11. The method of claim 10 allowing and end face of the shutoff member to be brought
15 into substantial alignment with a face of the mold cavity as the volume contraction occurs during the solidification of the molten lead in the battery part cavity.

12. The method of claim 10 including forming the shutoff member with a dimension less than the dimensions of the chamber so that when the shutoff member is in the closed
20 condition the molten lead remains in a molten state around the shutoff member.

13. The method of claim 10 wherein the shutoff member and the inlet passage are maintained with sufficient clearance therebetween to permit air to escape from the molten lead in the cavity but insufficient to permit molten lead to escape therewith.

25
14. The method of claim 10 including the step of applying a following force to the shutoff member through a moveable piston.

15. The method of claim 10 including the step of forming the mold inlet passage on a top side of the battery part cavity.

5 16. The method of claim 10 including the step of lowering the shutoff member into the fluid inlet passage while molten lead is present in the inlet passage.

17. The method of claim 16 including the step of maintaining a following force on the shutoff member when the shutoff member is in engagement with the inlet passage to permit
10 the shutoff member to follow a volume contraction of the molten lead as the molten lead solidifies.

18. The method of claim 10 wherein an internal volume reduction due to shrinkage is solely compensated by maintaining a following force on the molten lead until the molten
15 lead solidifies.

19. A method of enhanced gravity casting comprising:
directing a charge of molten lead into a chamber located in fluid communication with a battery part cavity;

20 allowing the battery part cavity to fill with molten lead under a gravity flow condition;

extending a shutoff member to prevent further gravity flow of molten lead into the mold cavity; and

25 maintaining a following force to generate sufficient pressure on the molten lead as the molten lead solidifies to cause a follower to reduce a volume of the battery part cavity in direct response to a volume contraction of the molten lead in the mold cavity to thereby form an enhanced battery part gravity casting.

20. The method of claim 19 including maintaining an air clearance but not a liquid clearance between the shutoff member and an inlet passage to the battery cavity.